

# Operating Instructions



## Zone 2 Ex i Field Device Coupler 4 spurs

> 9411/24



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## 2 General Information

### 2.1 Manufacturer

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### 2.2 Operating Instructions Information

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We reserve the right to make technical changes without notice.

### 2.3 Symbols Used

	Action request: Describes actions to be carried out by the user.
	Reaction sign: Describes the results or the reactions to the actions taken.
	Bullet
	Sentinel: Describes the notes and recommendations.
	Warning sign; danger from energised parts!
	Warning sign: Danger due to an explosive atmosphere!

### 3 General Safety Instructions

#### 3.1 Safety Instructions for Assembly and Operating Personnel

The operating instructions contain basic safety instructions which are to be observed during installation, operation and maintenance. Non-observance will endanger persons, plant and the environment.

##### **WARNING**

##### **Danger due to unauthorised work being performed on the device!**

- ▷ There is a risk of injury to persons and damage to equipment.
- ▶ Assembly, installation, commissioning, operation and maintenance must only be performed by personnel who are both authorised and suitably trained for this purpose.

##### **Before assembly/commissioning:**

- ▶ Read through the operating instructions.
- ▶ Give adequate training to the assembly and operating personnel.
- ▶ Ensure that the contents of the operating instructions are fully understood by the personnel in charge.
- ▶ The national installation and assembly regulations (e.g. IEC/EN 60079-14) apply.

##### **When operating the devices:**

- ▶ Ensure the operating instructions are made available on location at all times.
- ▶ Observe safety instructions.
- ▶ Observe national safety instructions and accident prevention regulations.
- ▶ Only run the device according to its performance data.
- ▶ Servicing/maintenance or repair work which are not described in the operating instructions must not be performed without prior agreement with the manufacturer.
- ▶ Any damage may render explosion protection of the device null and void.
- ▶ No changes to the device impairing their explosion protection are permitted.
- ▶ Install and use the device only if it is undamaged, dry and clean.

##### **If you have questions:**

- ▶ Contact the manufacturer.

#### 3.2 Warnings

Warnings are sub-divided in these operating instructions according to the following scheme:

##### **WARNING**

##### **Type and source of the danger!**

- ▷ Possible consequences.
- ▶ Measures to avoid danger.

They are always identified by the signalling word "WARNING" and sometimes also have a symbol which is specific to the danger involved.

## 4 Designated Use

### WARNING

#### Use the device for its intended purpose only!

- ▷ Otherwise, the manufacturer's liability and warranty expire.
- ▶ Only use the device under the operating conditions described in the operating instructions.
- ▶ The device must be used in areas subject to explosion hazards only according to these operating instructions.

#### Intended purpose

- ✗ For all fieldbuses with an IEC 61158-2 physical layer, e.g. Foundation Fieldbus H1 and Profibus PA.
- ✗ For non-intrinsically safe trunks, Ex nA connections.
- ✗ For intrinsically safe spurs (Ex i and FISCO) to connect intrinsically safe field devices.


#### Overview of explosion protection for field device coupler, trunk and spurs

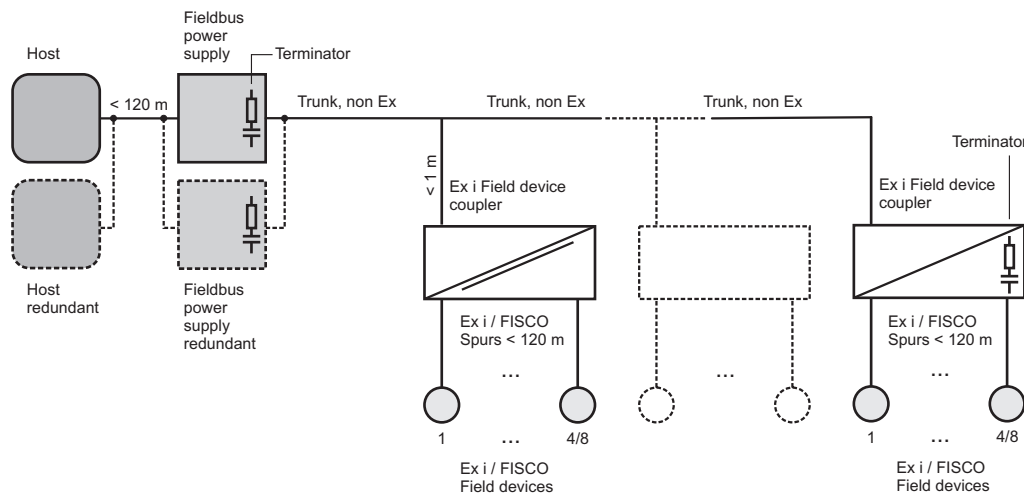
Field Device Coupler, Zone 2 EX i	Installation in					
	Zone 0	Zone 1	Zone 2	Zone 21	Zone 22	non-hazardous area
9411/24-310-31, 9411/24-320-31, 9411/24-330-31 without enclosure	not permitted	not permitted	Enclosure as per IEC/EN 60079-15 required	Enclosure as per IEC/EN 61241-1 (EN 60079-31) required	Enclosure as per IEC/EN 61241-1 (EN 60079-31) required	o.k.
Trunk	not permitted	not permitted	Ex nA	o.k.	o.k.	o.k.
Spurs	Ex ia	Ex ia	Ex nL	o.k.	o.k.	o.k.



The R. STAHL enclosure series 8146 (polyester), 8125 (sheet steel or stainless steel), 8126 (stainless steel) and 8150 (stainless steel) meet the requirements indicated above.

## 4.1 Exemplary assembly of a segment

	$\text{Length}_{\text{segment}} = \text{Length}_{\text{trunk}} + \sum \text{Length}_{\text{spurs}} \leq 1900 \text{ m}$ <p>For information on calculating the allowed segment, trunk and spur lengths, please refer to IEC 61158-2 and FF AG-181, Rev 3.1.</p>
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The field device couplers 9411/24 are suitable for use in hazardous areas of the Zones 2 and 22.

They are used for connecting up to four intrinsically safe field devices to a non-intrinsically safe trunk. For this, the trunk and spurs are galvanically isolated.

## 5 Technical Data

Certificates	
IECEX	IECEX BVS 08.0057 X
Europe (ATEX)	BVS 06 ATEX E 004 X
NEC	in preparation
Marking	
IECEX	
Coupler mounted on DIN rail	
Gas explosion protection	Ex nAc [ia] IIC T4
Dust explosion protection	[Ex ia] IIIC
Europe (ATEX)	
Coupler mounted on DIN rail	
Gas explosion protection	Ex II 3 (1) G Ex nAc [ia] IIC T4
Dust explosion protection	Ex II (1) D [Ex ia] IIIC
USA (NEC)	in preparation
Installation	in Zone 2, Zone 22 (dust), Class I, Zone 2, Class I Division 2 and in the safe area Suitable enclosure required e.g. R. STAHL Series 8146 (plastic) or 8125, 8150 (stainless steel)
Safety data (CENELEC) per spur	
	FISCO (IEC 60079-27)
Max. voltage $U_0$	15.7 V
Max. current $I_0$	245 mA
Max. power $P_0$	960 mW
Max. connectable capacitance $C_0$ for IIC/IIB	476 nF / 2878 nF
Max. connectable inductance $L_0$ for IIC/IIB	0.58 mH / 2.9 mH
Max. internal capacitance $C_i$	1.1 nF
Max. internal inductance $L_i$	~ 0 mH
Insulation voltage $U_m$	253 V
Electrical data	
Power supply	not required, the Field Device Coupler is powered from the trunk
Galvanic isolation	
	Test voltage according to EN 50020
Ex i spurs to trunk	1.5 kV AC
Ex i spur to Ex i spur	No galvanic isolation
Data transmission	
between trunk and spurs	passive, no repeater function
Trunk, not intrinsically safe	
Connections	2 trunk connections (in, out), internally bridged
Voltage range	16 ... 32 V
Undervoltage monitoring	$U < 16$ V, spurs de-energised

Electrical data				
Trunk, not intrinsically safe				
Max. current consumption		at 16 V	at 24 V	at 32 V
	0 mA per spur	28 mA	24 mA	22 mA
	20 mA per spur	120 mA	80 mA	65 mA
	40 mA per spur	220 mA	140 mA	105 mA
	3 spurs at 40 mA each, 1 spur in the short-circuit	235 mA	150 mA	105 mA
	Short-circuit all spurs	< 80 mA	< 60 mA	< 50 mA
Max. power dissipation	1.8 W			
Indication	Green LED "PWR" (U ≥ 16 V from trunk)			
Reverse polarity protection	yes			
Max. number of Field Device Couplers	4 per trunk			
Terminating resistor	The field device couplers have a built-in, switchable terminating resistor 100 Ω + 1 uF (IEC 61158-2). A jumper between the terminals TERM 1 and 2 connects the terminating resistance to the trunk. As an alternative, it is also possible to use an external terminating resistor series 9418.			
Spurs, intrinsically safe FISCO Ex i				
Quantity	4			
Max. cable length	120 m			
Output voltage	≥ 10 V at 40 mA per spur			
Current range	0 ... 41 mA per spur			
Min. no-load voltage	12 V			
Max. internal resistance	65 Ω			
Max. short-circuit current	50 mA			
Indication per spur	Yellow LED "S1" ... "S4"			
Earthing of cable shields (trunk and spurs)				
Direct earthing	on the shield bus (option)			
Capacitive earthing	via 4.7 nF at terminal "S"; PE must be connected. (Earth bolt M6)			
Power management	If the trunk voltage exceeds 16 V, the spurs are switched on one after the other to prevent a high start-up current due to the field devices. A short circuit detected on a spur will deactivate the respective spur until the short-circuit is removed. Regardless of how many spurs are short-circuited, the trunk is loaded with max one short-circuit current. This minimises the current consumption of the trunk and the power dissipation under all operating conditions.			
Fault detection				
Spur short-circuit	≥ 42 ... 50 mA			
Indication of short-circuit per spur	Yellow LED "S1" ... "S4", flashes			
Collective error message	Red LED "ERR" flashes			
Error indication on field device coupler	Red LED "ERR"			
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326 (IEC/EN 61000-4-1...6 and 11; EN 55022 class B); NAMUR NE 21 (IEC/EN 61000-4-1...6, 8 and 11; EN 55022 class B)			
Ambient conditions				
Ambient temperature	Coupler mounted on DIN rails:	- 40 ... + 75 °C		
	Coupler built in a standard enclosure:	- 20 ... + 70 °C		
Storage temperature	- 40 ... + 75 °C			
Relative humidity (no condensation)	< 95 %			

## Mechanical data

### Degree of protection

Enclosure

IP30

Ex i terminals

IP20

Ex e terminals

IP 30, cover closed  
(enclosure may be opened in hazardous area while connected to power)

### Terminals

3pole (+, -, screen)	screw terminals	detachable screw terminals
	trunk	only for spurs Ex i (trunk see "screw terminals")
	spurs Ex i	
rigid	0.2 ... 4 mm <sup>2</sup>	0.2 ... 4 mm <sup>2</sup>
flexible	0.25 ... 2.5 mm <sup>2</sup>	0.25 ... 2.5 mm <sup>2</sup>
flexible, end covering sleeves	0.25 ... 2.5 mm <sup>2</sup>	0.25 ... 2.5 mm <sup>2</sup>

### Weight

0.735 kg

### Assembly

on DIN rail, EN 50022 (NS 35/15, NS 35/7.5) or mounting plate

### Installation position

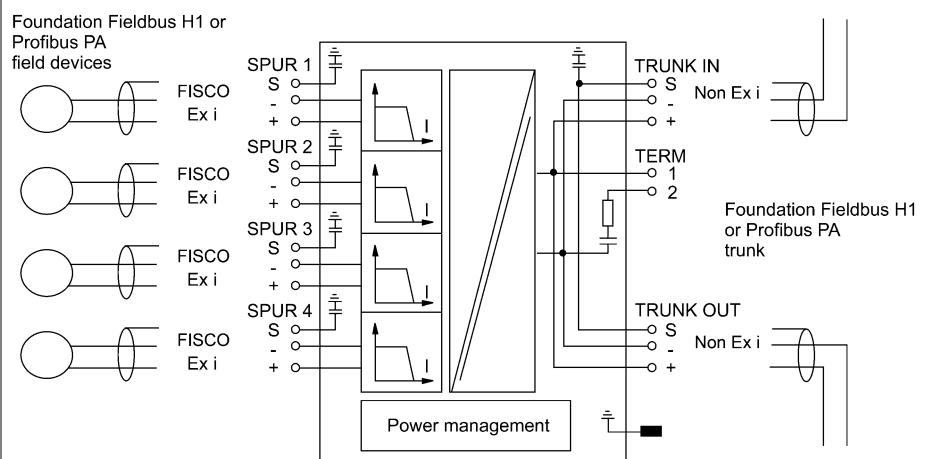
vertical or horizontal

### Fire protection class (UL-94)

HB

## Installation conditions

### Connection diagram

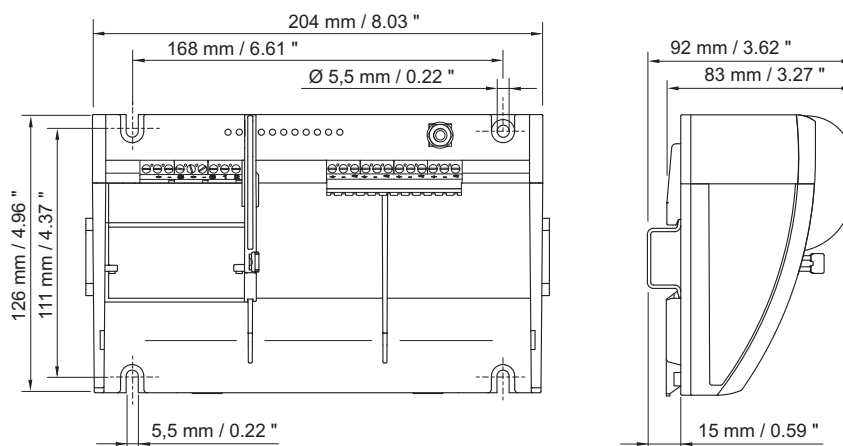


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Additional technical data for layout and design: see the data sheet

## Dimensional Drawings (All Dimensions in mm / inches) - Subject to Alterations



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### 9411/24-3.0-31

Zone 2 Ex i Field Device Coupler without enclosure



## 6 Functional Description

The field device coupler is used for connecting up to four intrinsically safe field devices to a non-intrinsically safe trunk. For this, the trunk and spurs are galvanically isolated.

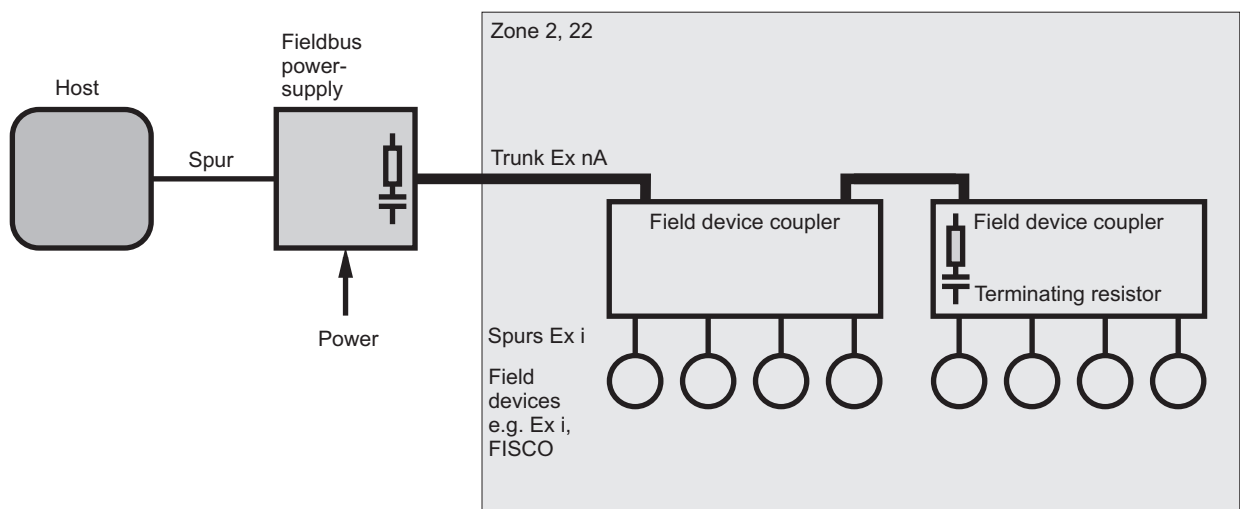
The field device coupler works on the physical level, that means that it works independently of the protocol used. It can therefore be used for every fieldbus which complies to IEC/EN 61158-2. At the moment, these are the Foundation Fieldbus H1 and the Profibus PA.

Each field device can be supplied with a maximum current of 40 mA. As short circuit protection, each spur is equipped with a functional current limitation to 50 mA.

A terminating resistor is built-in and can be activated/deactivated via a jumper.

Cable shields can either be capacitively or directly earthed. Trunk and spurs can be earthed differently.

The trunk voltage connected to the field device coupler is monitored for undervoltage ( $< 16\text{ V}$ ) and an LED indicates its status. Other LEDs indicate the status of the spurs (see chapter 11).



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### Power management

#### Soft start:

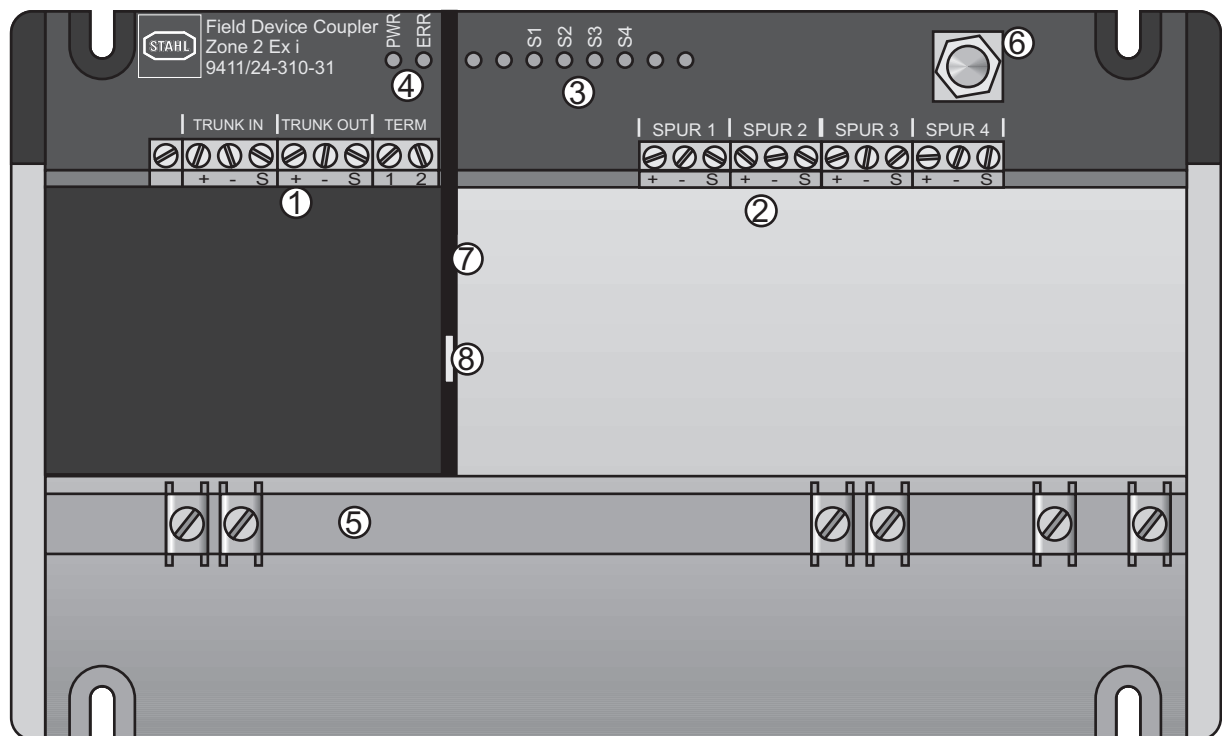
As soon as the trunk voltage exceeds 16 V, the spurs are activated one after the other to prevent a high start-up total current due to the field devices. By this, the segment can be activated "softly" without current peaks which may overload the included fieldbus power supply and which may have a negative effect on the function of the field device couplers due an increased voltage drop.

#### Short-circuit switch-off

In the event of a short-circuit, the spur in question is deactivated until the short-circuit is eliminated.

If several spurs are affected by a short-circuit, the trunk is loaded only with one short-circuit current. This minimises the current consumption of the trunk and the power dissipation of the field device coupler under all operating conditions.

## 7 Device design



03675E00

- |   |   |
|---|---|
| 1 | Ex nA area; Ex nA terminals for the trunk and the jumper (8) to activate the terminator (performing work on the Ex nA connections in Zone 2 is only permitted if de-energised!) |
| 2 | Ex i area; Ex i terminals for spur 1 ... spur 4 incl. cable shield support (capacitive)   |
| 3 | Indication LEDs for spur 1 ... spur 4   |
| 4 | Indication LEDs for PWR (power) and ERR (error)   |
| 5 | Shield bus with terminals (option) movable towards the cable shield support (see chapter "Accessories and Spare Parts")   |
| 6 | Earth bolt for earthing   |
| 7 | Partition; guarantees prescribed spacing of lead wires between Ex nA and Ex i terminals   |
| 8 | Park position for jumper  |

## 8 Transport, Storage and Disposal

### Transport

- ▶ Shock-free in its original carton, do not drop, handle carefully.




### Storage

- ▶ Store in a dry place in its original packaging
- ▶ Permitted temperature range for storage in original packaging: - 40 °C ... + 75 °C

### Disposal


- ▶ Ensure environmentally friendly disposal of all components according to the legal regulations.

## 9 Assembly

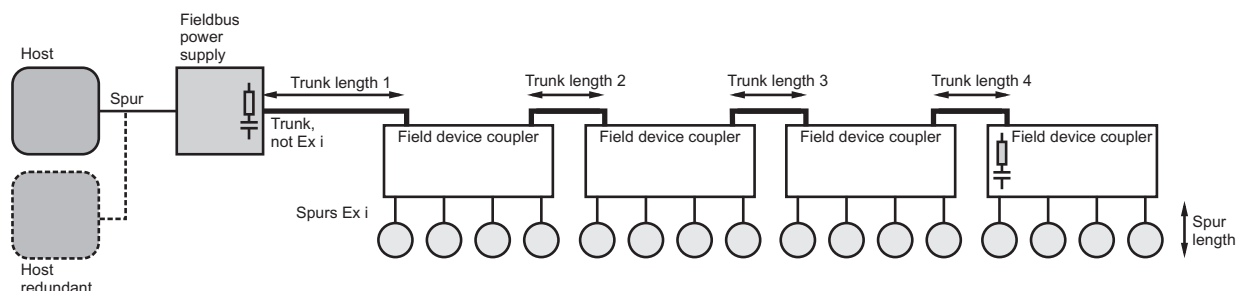
⚠ WARNING	
	<b>Incorrectly installed components!</b> <ul style="list-style-type: none"> <li>▷ Explosion protection cannot be guaranteed any more if the components are incorrectly installed.</li> <li>▶ Carry out the assembly in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).</li> </ul>
	Do not select a mounting location that requires a cable length exceeding the maximum permissible value (see chapter 10.3 "Cable lengths for trunk and spurs").
	Field device couplers without enclosures are always delivered ready for DIN rail mounting.

- ✗ For installation in non-hazardous areas, e.g. in normal control cabinet or open rack.
- ✗ For installation in an enclosure.

## 10 Installation

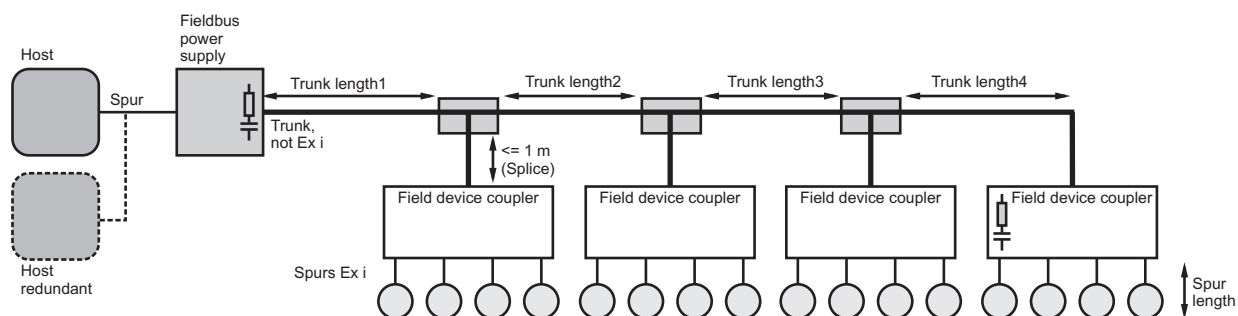
<b>⚠ WARNING</b>	
	<p><b>Incorrectly installed components!</b></p> <ul style="list-style-type: none"> <li>Explosion protection cannot be guaranteed any more if the components are installed incorrectly.</li> <li>Carry out the installation in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).</li> </ul>

### 10.1 Examples of fieldbus segment topologies



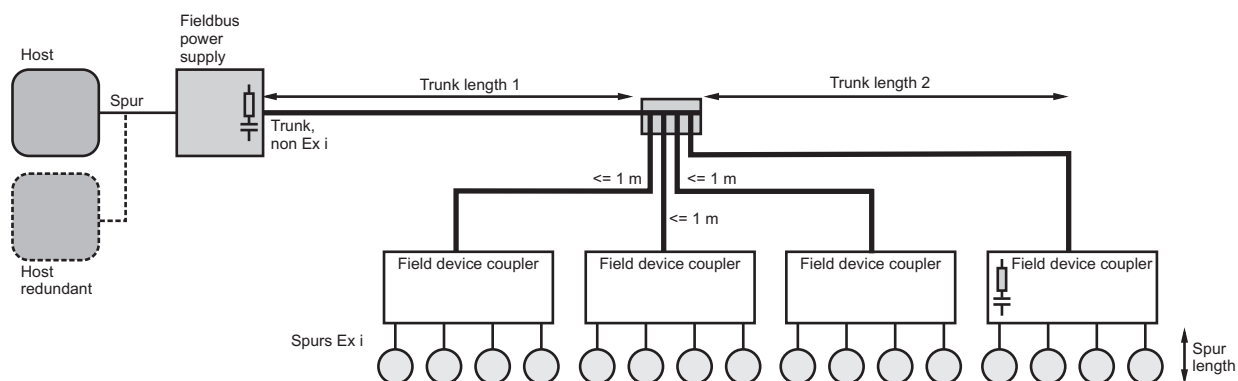
13690E01

Fieldbus segment with "daisy chain structure". The trunk is looped through the field device couplers.



13691E01

Fieldbus segment in which the field device couplers are connected to the trunk with junction boxes (T-connectors).



13692E01

Fieldbus segment with star structure.

## 10.2 Proof of intrinsic safety

### Proof of intrinsic safety in accordance with FISCO

A spur is intrinsically safe if:

- ✗ the field device is certified in accordance with FISCO.
- ✗ the conditions regarding cable values as per IEC 60079-27 are adhered to:
  - $R_C$  15 ... 150 Ohm/km
  - $L_C$  0,4 ... 1 mH/km
  - $C_{Cable}$ : 45 ... 200 nF/km

### Proof of intrinsic safety in accordance with the classical "entity concept"


A spur is intrinsically safe if the safe maximum values of the field device and spur connections meet the following conditions:


Spur of a field device coupler      Field device

$U_o$	$\leq$	$U_i$
$I_o$	$\leq$	$I_i$
$P_o$	$\leq$	$P_i$
$C_o$	$\geq$	$C_i + C_{Cable}$
$L_o$	$\geq$	$L_i + L_{Cable}$


Whereby,  $C_{Cable}$  and  $L_{Cable}$  describe the total capacity respectively inductance of the spur cable, which result from the respective cable length.


## 10.3 Cable lengths for trunk and spurs in accordance with IEC 61158-2, Annex B (without considering the explosion protection)


	For the selection we recommend the use of our free planning tool "Fieldbus Wizard". It can be downloaded on the internet from <a href="http://www.fieldbus-solutions.info">www.fieldbus-solutions.info</a> .
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	The maximum length of all cables (all trunks, all spurs) per segment must not exceed 1900 m.
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	Number of all field devices on the segment, including host(s)				
	1 ... 12	13 ... 14	15 ... 18	19 ... 24	25 ... 30
Max. cable length for spurs, 1 field device per spur	120 m	90 m	60 m	30 m	1 m
max. cable length for spurs when a redundant host is used	90 m	60 m	30 m	1 m	1 m

	The actual trunk and spur lengths can be shorter due to voltage drop.
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	The maximum length of an Ex i spur according to IEC 60079-27 (FISCO) is 60 m. According to the FISCO standards, the Ex i spurs of a field device coupler must be considered as a new segment (maximum segment length = trunk + spurs = 1000 m). The table shown above can be used for this purpose.
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	The following generally applies: Spurs should be kept as short as possible.
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## 10.4 Examples of cable lengths

**Cable lengths for trunk with 12 field devices with a current consumption of 15 mA each:**

Assumption:

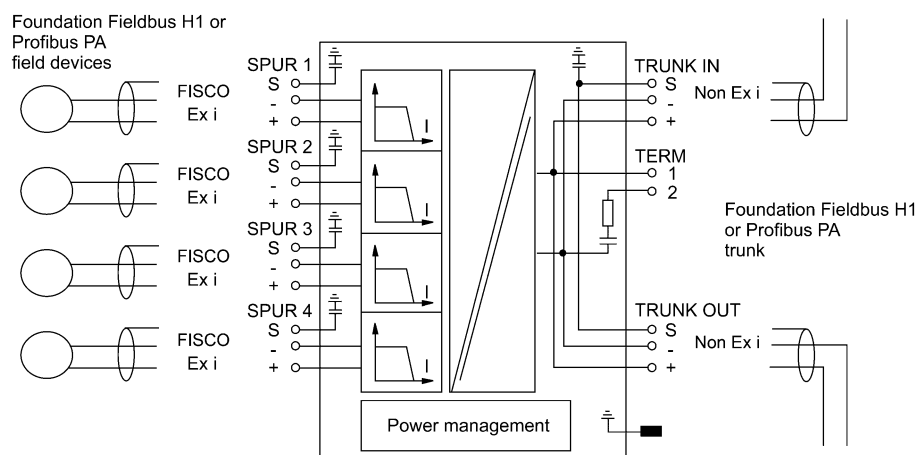
- ✗ Fieldbus power supply with  $U_o > 25 \text{ V} / I_o > 350 \text{ mA}$ .
- ✗ Current consumption of host is 20 mA.
- ✗ Type A fieldbus cables (loop resistance:  $48 \Omega/1000 \text{ m}$ ) are used.
- ✗ Three field bus couplers are located at the end of the trunk.
- ▷ Maximum trunk length: approx. 600 m

**Cable lengths for trunk with 16 field devices with a current consumption of 15 mA each:**

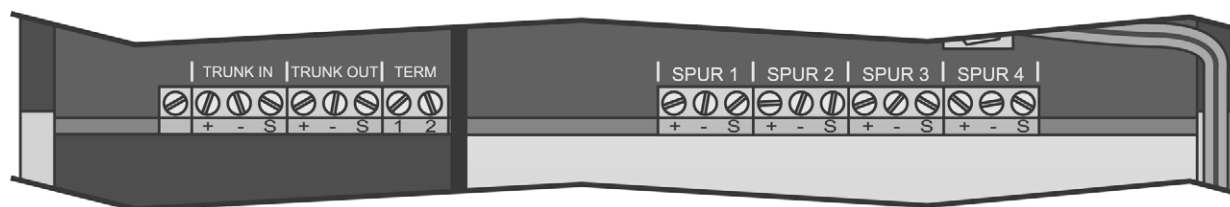
Assumption:

- ✗ Fieldbus power supply with  $U_o > 25 \text{ V} / I_o > 350 \text{ mA}$ .
- ✗ Current consumption of host is 20 mA.
- ✗ Type A fieldbus cables (loop resistance:  $48 \Omega/1000 \text{ m}$ ) are used.
- ✗ Four field bus couplers are located at the end of the trunk.
- ▷ Maximum trunk length: approx. 380 m

## 10.5 Connection





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## Trunk connection

⚠ <b>WARNING</b>	
	<b>Danger due to energised parts!</b> <ul style="list-style-type: none"> <li>▶ Explosion protection is not guaranteed any longer.</li> <li>▶ Before carrying out work on the trunk in hazardous areas, the fieldbus must be de-energised.</li> <li>▶ Secure the fieldbus against unauthorised activation.</li> </ul>
	TRUNK IN and TRUNK OUT (+,-,S) are through-connected inside the field device coupler.


- ▶ Disconnect the fieldbus from the power supply.
- ▶ Open the enclosure.
- ▶ Insert the cables in the corresponding terminals:  
 TRUNK IN: cable from the host or the fieldbus power supply  
 TRUNK OUT: cable to the next field device coupler
- ▶ Close/tighten the terminals.
- ▶ Close the enclosure.

## Spur connection



	Work can be carried out on the intrinsically safe spurs even if they are under voltage.
	Only <b>one</b> field device should be connected on each spur connection.

- ▶ Open the enclosure.
- ▶ Insert the cables in the corresponding terminals.
- ▶ Close/tighten the terminals.
- ▶ Close the enclosure.

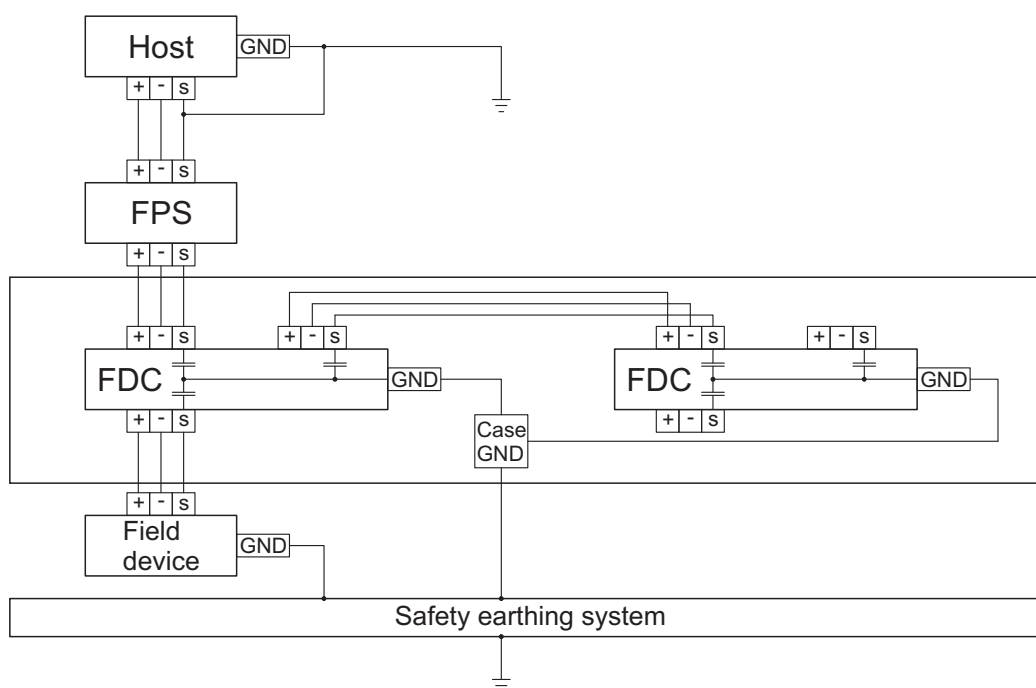
## 10.6 Earthing

	The field device coupler is not required to be connected to earth. The cable shields must be connected to earth according to chapter 10.7 if they are used in Zone 2.
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### Capacitive earthing

 <b>WARNING</b>	
	<p><b>Danger due to shield voltage</b></p> <ul style="list-style-type: none"> <li>▶ In case of capacitive earthing of the cable shields, the earth bolt of the field device must be connected to the equipotential bonding of the hazardous area. This guarantees that the interference voltages that may occur are removed.</li> <li>▶ Connect the earthing bolt of the field device coupler to the equipotential bonding of the hazardous area.</li> </ul>

- ▶ Connect the cable shields on the "S" terminals.
- ▶ Connect the earthing bolt of the field device coupler to the equipotential bonding of the hazardous area.

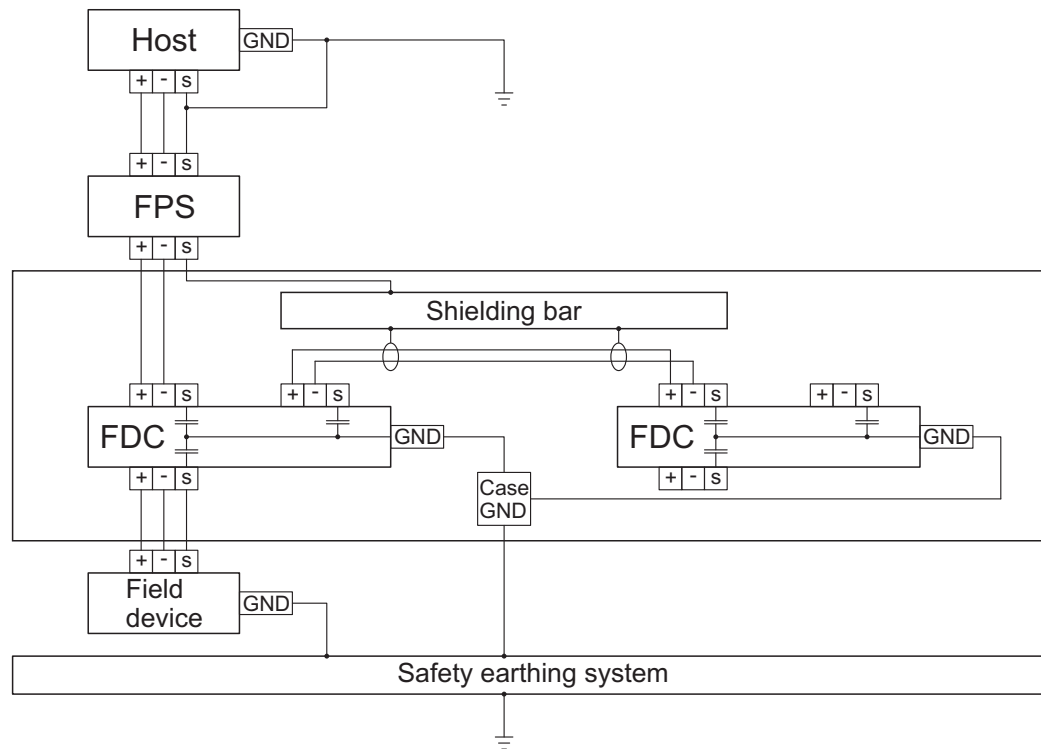


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### Alternative: earthing by means of a shield bus (option)

- Connect the shield bus to the equipotential bonding of the hazardous area and to the earth bolt of the field device coupler.




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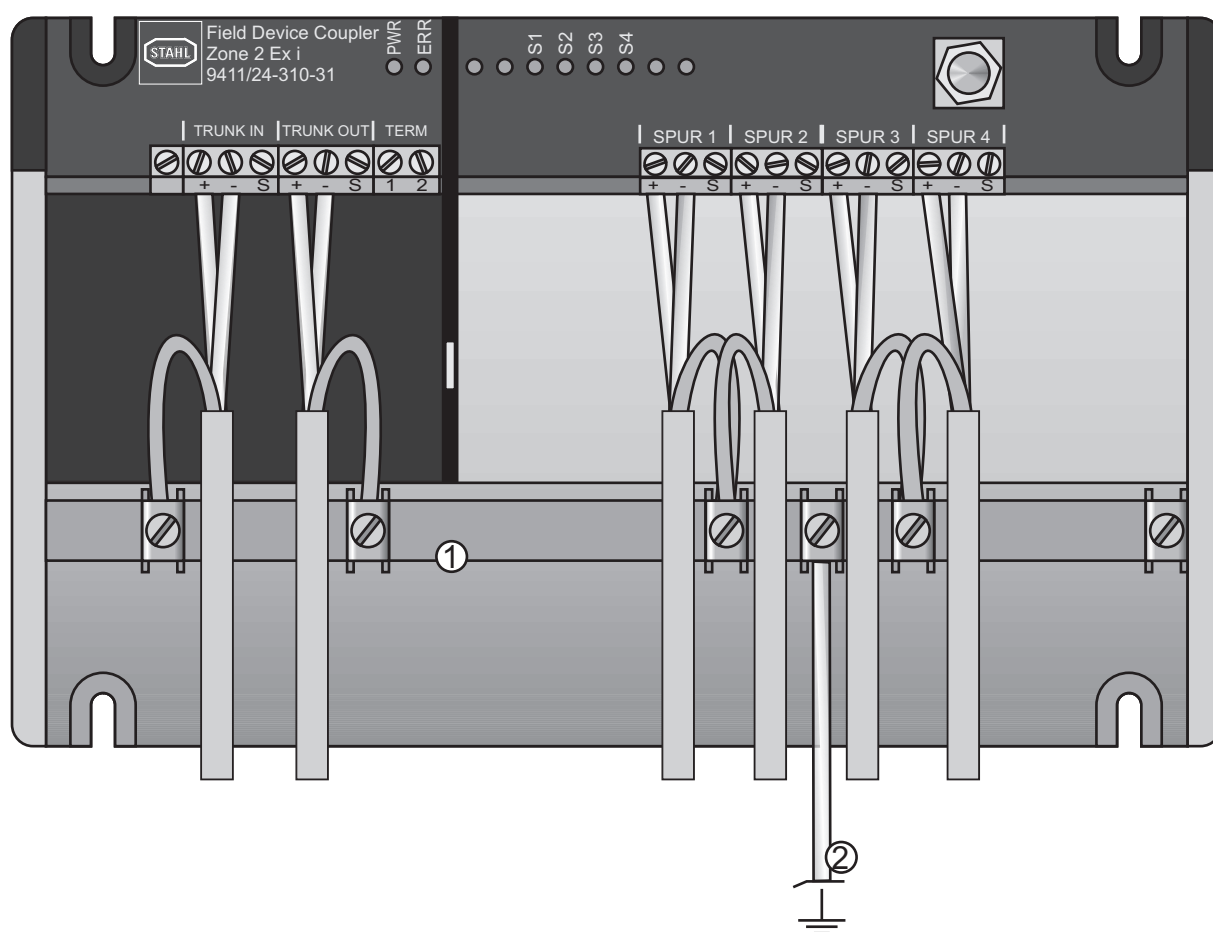
## 10.7 Earthing of Cable Shields

There are many, and sometimes inconsistent, regulations regarding earthing of cable shields:

- ✗ IEC/EN 60079-14, section 12.2.2.3
- ✗ Profibus Technical Guideline „Profibus PA“ User and Installation Guideline, section 3.3.3
- ✗ Fieldbus Foundation™ „System Engineering Guidelines“ AG 181, V3.1f


### Multiple point earthing (with optional shield bus):

	<p>This shielding concept is recommended by R.STAHL. The direct earthing of the cable shields at both cable ends is the best solution with regard to the electromagnetic compatibility. The prerequisite for this is a high-quality equipotential bonding.</p>
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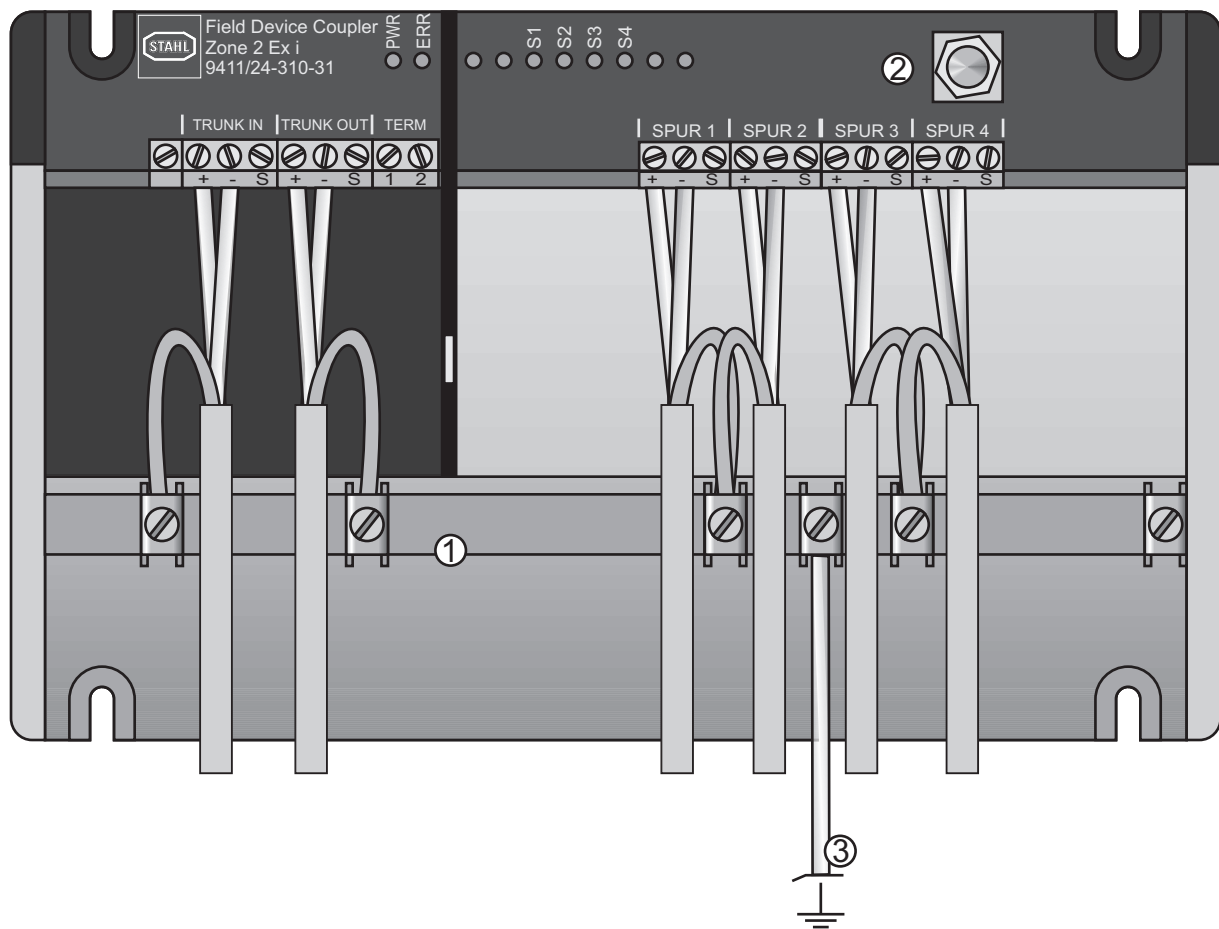
13696E00

- Lay all cable shields of the trunk and spurs on the shield bus (1).
- Connect the cable screen bus bar to earth via the shortest possible route (2).

	<p>When directly mounted (with screws) in a metal enclosure 8125, the earth bolt is electrically connected to the enclosure.</p>
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- Directly earth the cable shield of the trunk at the host/fieldbus power supply side (normally at the fieldbus power supply).
- Directly earth the cable shields of the spurs at the field devices.

## Single point earthing (with optional shield bus):



13698E00


- ▶ Connect the cable shields of the trunk to the “TRUNK IN S” terminals and, if needed, to the “TRUNK OUT S” (1).
- ▶ Connect the earth bolt (2) with the shield bus so that good conductance is achieved (delivery status).
- ▶ Connect the cable screen bus bar to earth via the shortest possible route (3).
- ▷ In this way, the cable shields of the trunk are capacitively earthed.

	When directly mounted (with screws) in a metal enclosure 8125, the earth bolt is electrically connected to the enclosure.
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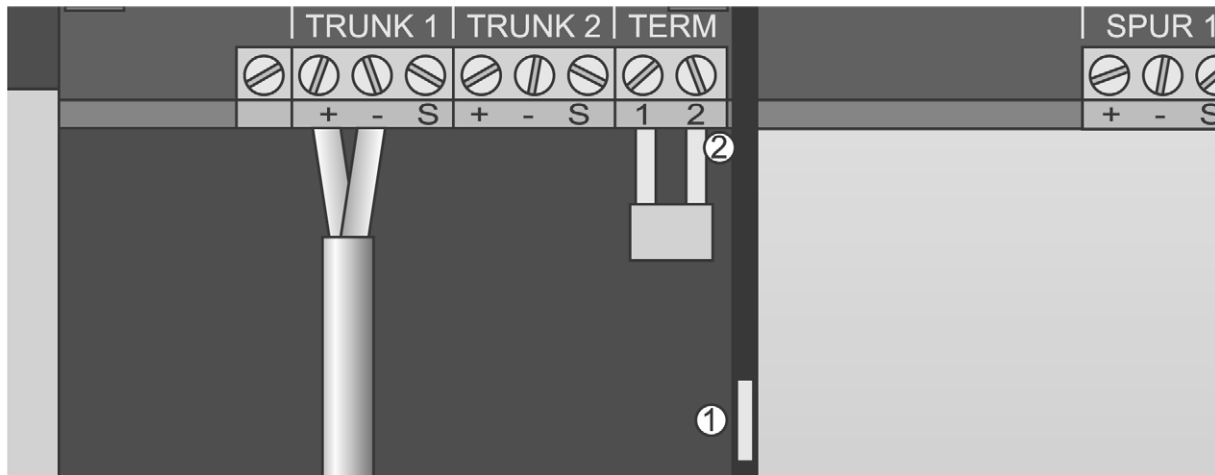
- ▶ Lay the cable shields of the spurs on the shield bus.
- ▶ Directly earth the cable shield of the trunk at the host/fieldbus power supply side (normally at the fieldbus power supply).
- ▶ Isolate the cable shields of the spurs connected to the field devices and do not earth them.

Installations according to Fieldbus Foundation™ AG 181 (shielding using signal isolators), require a capacitive earthing of the spurs and/or trunks to the "S" terminals. The earth bolt must be connected to the equipotential bonding.

## 10.8 Terminator

	A terminating resistor is required at both ends of the trunk. Spurs are operated without terminating resistors.
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**Field device coupler is located at the end of the trunk**

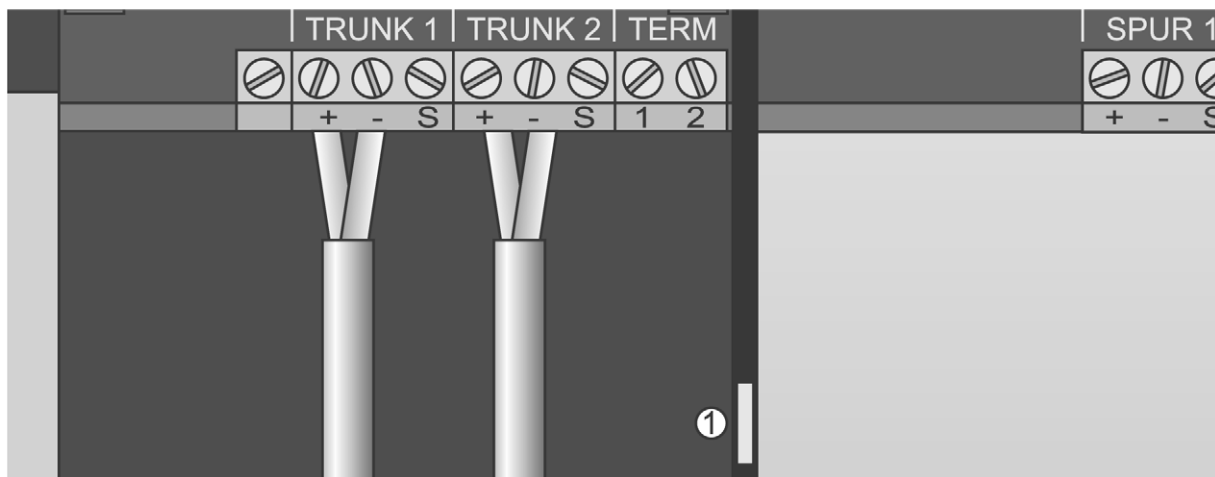


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	The terminals on the "TRUNK OUT" terminal block are not to be used.
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- ▶ Remove the provided jumper from the park position (1).
- ▶ Insert the jumper in terminals "1" and "2" on the "TERM" terminal block (2).
- ▶ Close/tighten the terminals.
- ▷ The built-in terminating resistor is activated.

**Field device coupler is not located at the end of the trunk**



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	The terminals on the "TERM" terminal block are not to be used.
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- ▶ Insert the provided jumper in the park position (1).
- ▷ The built-in terminating resistor is not activated.

## 11 Putting into Service

### Before commissioning

- ▶ Test the components for correct operation and installation in accordance with the operating instructions and other applicable specifications.
- ▶ Check whether cables and lines are clamped properly.
- ▶ Inspect enclosure for damage.
- ▶ Inspect enclosure for foreign bodies.
- ▶ Check whether all unused cable glands and holes are sealed off properly.

### During commissioning

- ▶ Observe the national regulations when commissioning.
- ▶ Observe the directives in accordance with EN 60079-17 when performing functional checks.
- ▶ The voltage on the trunk must be at least 16 V DC.
- ▶ The voltage on the connected field devices must be at least 9 V DC.



### LED indicators, functional description



11451E00

PWR, green	ERR, red	S (1 ... 4), yellow	Description
Off	Off	Off	No voltage on the trunk
On	Off	Off	Voltage on the trunk o.k. $U \geq 16 \text{ V}$
	Off	Off	Open-circuit on the corresponding spur Spur not connected $I \leq 1 \text{ mA}$
	Off	On	Corresponding spur connected to field device, $3 \leq I \leq 40 \text{ mA}$
	Flashing	Flashing	Short-circuit on the corresponding spur $40 \text{ mA} \leq I \leq 50 \text{ mA}$
	On		Internal device fault
	On	Fast flashing	The respective spur causes an overload (total current consumption of the connected field devices $> 160 \text{ mA}$ during rated operation)

## 12 Maintenance

⚠ WARNING	
	<b>Danger due to energised parts!</b>
	<ul style="list-style-type: none"> <li>▷ Explosion protection is not guaranteed any longer.</li> <li>▶ Before carrying out work on the trunk in hazardous areas, the fieldbus must be de-energised.</li> <li>▶ Secure the fieldbus against unauthorised activation.</li> </ul>
	 <p>The enclosure may be opened while connected to power. Work can be carried out on the intrinsically safe spurs even if they are under voltage.</p>


### 12.1 Regular Maintenance Work

- ▶ Consult the relevant national regulations (e.g. IEC/EN 60079-17) to determine the type and extent of inspections.
- ▶ Plan the intervals so that any defects in the equipment which may be anticipated are promptly detected.

#### To check as part of the maintenance schedule:

- ✗ Check that cables and lines are clamped properly.
- ✗ Tightness of the cable glands.
- ✗ Inspect the enclosure for visual damage.
- ✗ Check the seal between enclosure and cover.
- ✗ Check the enclosure for moisture
- ✗ Check the compliance with the permitted temperatures.
- ✗ Make sure that the device is used according to its designated use.


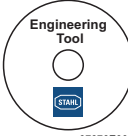



### 12.2 Repair work

⚠ WARNING	
	<b>Danger due to improper maintenance/repairs</b>
	<ul style="list-style-type: none"> <li>▷ Explosion protection is not guaranteed any longer.</li> <li>▶ Repair work to the device must only be performed by R. STAHL.</li> </ul>

### 12.3 Cleaning

- ✗ Clean with a cloth, brush, vacuum cleaner or similar items.
- ✗ When cleaning with a damp cloth use water or mild, non-abrasive, non-scratching cleaning agents.
- ✗ Never use aggressive cleaning agents or solvents.

## 13 Accessories and Spare Parts

Designation	Illustration	Description	Order number	Weight kg
Terminator	 06501E00	Fieldbus Terminator "Ex m"	9418/01-201-10	0.080
		Fieldbus Terminator "Ex i"	9418/02-201-10	0.080
Fieldbus Wizard Engineering Tool	 07376E00	Engineering tool for segment design of fieldbus foundation or Profibus PA fieldbus installations	Download under <a href="http://www.fieldbus-solutions.info">www.fieldbus-solutions.info</a>	
Fieldbus Power Supply	 12783E00	Fieldbus power supply and diagnosis	9412/00-310-11s	0.135
	 12809E00	Fieldbus power supply, diagnosis and adjustable warning level	9412/00-320-11s	0.135
Earthing bar set 4 K	 01525E00	Earthing bar 9411 spring terminal strap with 6 terminals	202774	0.128